

THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application. Where claims have been amended and/or canceled, such amendments and/or cancellations are done without prejudice and/or waiver and/or disclaimer to the claimed and/or disclosed subject matter, and Applicants reserve the right to claim this subject matter and/or other disclosed subject matter in a continuing application.

1. (original) A magnetic tunnel element, comprising:

a first layer formed from an amorphous material;

an amorphous tunnel barrier layer; and

an interface layer between and in proximity with the first layer and the tunnel barrier layer, the interface layer being formed from at least one material selected from the group consisting of ferromagnetic materials and ferrimagnetic materials, wherein the interface layer material is crystalline when it is in isolation from both the first layer and the tunnel barrier layer.

2. (original) The magnetic tunnel element according to claim 1, wherein the first layer is formed from at least one material selected from the group consisting of amorphous ferromagnetic materials and amorphous ferrimagnetic materials.

3. (original) The magnetic tunnel element according to claim 1, further comprising a second layer in contact with the tunnel barrier layer and including at least one material selected from the group consisting of ferromagnetic materials and ferrimagnetic materials, and
wherein the first layer, the interface layer, the tunnel barrier layer and the second layer form a magnetic tunnel junction.

4. (previously presented) The magnetic tunnel element according to claim 3, wherein the magnetic tunnel junction has a tunneling magnetoresistance that is greater than 50 %.

5. (previously presented) The magnetic tunnel element according to claim 3, wherein the magnetic tunnel junction has a tunneling magnetoresistance that is greater than 60 %.

6. (previously presented) The magnetic tunnel element according to claim 3, wherein the magnetic tunnel junction has a tunneling magnetoresistance that is greater than 65 %.

7. (original) The magnetic tunnel element according to claim 3, wherein the interface layer is configured to increase the tunneling magnetoresistance of the magnetic tunnel junction.

8. (original) The magnetic tunnel element according to claim 1, further comprising: a metal-containing layer in contact with the tunnel barrier layer; and a semiconductor layer that is in contact with the first layer, wherein the metal-containing layer, the tunnel barrier, the interface layer, the first layer and the semiconductor layer form a magnetic tunneling transistor.

9. (original) The magnetic tunnel element according to claim 1, further comprising a semiconductor material layer in proximity with the tunnel barrier layer, wherein the semiconductor layer, tunnel barrier layer, the interface layer and the first layer form a spin-injector or detector device.

10. (original) The magnetic tunnel element according to claim 1, wherein the interface layer includes at least one of Fe and an Fe-containing alloy.

11. (original) The magnetic tunnel element according to claim 10, wherein the Fe-

containing alloy includes Co.

12. (original) The magnetic tunnel element according to claim 11, wherein the CoFe alloy contains between about 10 atomic percent and 95 atomic percent Fe.

13. (original) The magnetic tunnel element according to claim 10, wherein the Fe-containing alloy includes Ni.

14. (previously presented) The magnetic tunnel element according to claim 10, wherein the Fe-containing alloy is formed from Fe and one of Co and Ni.

15. (original) The magnetic tunnel element according to claim 1, wherein the tunnel barrier layer includes an oxide of at least one of Al, Ga and In.

16. (original) The magnetic tunnel element according to claim 1, wherein the first layer includes an alloy of Co, Fe and B.

17. (original) The magnetic tunnel element according to claim 16, wherein the CoFeB alloy is an alloy of the form $(Co_{70}Fe_{30})_{100-x}B_x$.

18. (original) The magnetic tunnel element according to claim 17, wherein x is between about 15 and 20.

19. (original) The magnetic tunnel element according to claim 1, wherein the first layer includes an alloy of Co, Fe, X and Y,

wherein X and Y are independent and chosen from the group consisting of B, Hf, Zr, C, Be, Si, Ge, P and Al.

20. (original) The magnetic tunnel element according to claim 19, wherein at least one of X and Y causes the alloy to be amorphous.

21. (original) The magnetic tunnel element according to claim 1, wherein the first layer includes an alloy of Co, Fe and Zr.

22. (original) The magnetic tunnel element according to claim 1, wherein the thickness of the interface layer is less than 30 Å.

23. (original) The magnetic tunnel element according to claim 1, wherein the thickness of the interface layer is less than 20 Å.

24. (original) The magnetic tunnel element according to claim 1, wherein the thickness of the interface layer is selected so that the interface layer is amorphous.

25. (original) A magnetic tunnel element, comprising:

a first layer formed from an amorphous material;

an amorphous tunnel barrier layer; and

an interface layer between and in proximity with the first layer and the tunnel barrier layer, the interface layer being formed from at least one material selected from the group consisting of ferromagnetic materials and ferrimagnetic materials, wherein the interface layer material is crystalline when it is in isolation from both the first layer and the tunnel barrier layer, the thickness of the interface layer being selected so that the interface layer is not crystalline.

26. (original) The magnetic tunnel element according to claim 25, wherein the first layer is formed from at least one material selected from the group consisting of amorphous ferromagnetic materials and amorphous ferrimagnetic materials.

27. (original) A memory device, comprising:
a first plurality of conductive lines;
a second plurality of conductive lines overlapping the first plurality of conductive lines at a plurality of intersecting regions; and

a plurality of nonvolatile memory cells formed at respective intersecting regions, at least one nonvolatile memory cell including a magnetic tunnel element comprising a first layer formed from an amorphous material, an amorphous tunnel barrier layer, and an interface layer between the first layer and the tunnel barrier layer, wherein the interface layer is formed from at least one material that is crystalline when the material is in isolation from both the first layer and the tunnel barrier layer, and wherein the interface layer is formed from a material selected from the group consisting of ferromagnetic materials and ferrimagnetic materials.

28. (original) The memory device according to claim 27, wherein the first layer is formed from at least one material selected from the group consisting of amorphous ferromagnetic materials and amorphous ferrimagnetic materials.

29. (original) The memory device according to claim 28, wherein the magnetic tunnel element further includes a second layer in contact with the tunnel barrier layer and formed from at least one material selected from the group consisting of ferromagnetic materials and ferrimagnetic materials, and

wherein the first layer, the interface layer, the tunnel barrier layer and the second layer form a magnetic tunnel junction.

30. (original) The memory device according to claim 29, wherein the magnetic tunnel junction has a tunneling magnetoresistance that is greater than 50 %.

31. (original) The memory device according to claim 29, wherein the magnetic tunnel junction has a tunneling magnetoresistance that is greater than 60 %.

32. (original) The memory device according to claim 29, wherein the magnetic tunnel junction has a tunneling magnetoresistance that is about 65 %.

33. (original) The memory device according to claim 27, wherein the thickness of the interface layer is less than 30 Å.

34. (original) The memory device according to claim 27, wherein the thickness of the interface layer is less than 20 Å.

35. (original) The memory device according to claim 27, wherein the thickness of the interface layer is selected so that the interface layer is amorphous.

Claims 36-50. (canceled)

51. (previously presented) The magnetic tunnel element according to claim 1, wherein the interface layer comprises no glass-forming elements.

52. (previously presented) The magnetic tunnel element according to claim 8, wherein current passing from the first layer to the semiconductor layer comprises spin-polarized current.

53. (previously presented) The magnetic tunnel element according to claim 9, wherein current passing from the first layer to the semiconductor layer comprises spin-polarized current.

54. (previously presented) The magnetic tunnel element according to claim 25, wherein the interface layer comprises no glass-forming elements.

55. (previously presented) The memory device according to claim 27, wherein the interface layer comprises no glass-forming elements.